

U.S. Patent Application Serial No. 10/647,237  
Supplemental Amendment filed October 24, 2006  
Reply to OA dated March 8, 2006

**AMENDMENTS TO THE CLAIMS:**

Please amend claims 1, 5, 6 and 20, as follows. This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claim 1 (Currently Amended): A dielectric waveguide, comprising:

a first single crystal magnesium oxide block having ~~a surface of the~~ an input face of orientation (001), (100) or (010), and having other faces each of orientation (001), (100) or (010);

a first copper oxide superconducting film disposed on each of said surface other faces of said first single crystal magnesium oxide block in a c-axis crystal orientation perpendicular to ~~four or more of the other faces~~ the face of said block on which it is disposed;

a second single crystal magnesium oxide block having a ~~surface of the~~ face of orientation (001), (100) or (010); and

a second copper oxide superconducting film disposed on said ~~surface~~ face of said second single crystal magnesium oxide block in a c-axis crystal orientation perpendicular to said ~~surface~~ face of said second single crystal magnesium oxide block,

wherein said first single crystal magnesium oxide block has a face oriented at a 45 degree angle to ~~the~~ said input face, so as to have orientation (011), (101) or (110), and said second copper oxide superconducting film comes in contact with said ~~surface~~ face oriented at a 45 degree angle of said first single crystal magnesium oxide block.

Claim 2 (Canceled).

Claim 3 (Previously Presented): The dielectric waveguide according to claim 1, wherein said first copper oxide superconducting film is an oxide high-temperature superconductor comprising a compound showing crystal structure anisotropy selected from the group consisting of  $\text{Bi}_{n1}\text{Sr}_{n2}\text{Ca}_{n3}\text{Cu}_{n4}\text{O}_{n5}$  ( $1.8 \leq n1 \leq 2.2$ ,  $1.8 \leq n2 \leq 2.2$ ,  $0.9 \leq n3 \leq 1.2$ ,  $1.8 \leq n4 \leq 2.2$ ,  $7.8 \leq n5 \leq 8.4$ ),  $\text{Pb}_{k1}\text{Bi}_{k2}\text{Sr}_{k3}\text{Ca}_{k4}\text{Cu}_{k5}\text{O}_{k6}$  ( $1.8 \leq k1+k2 \leq 2.2$ ,  $0 \leq k1 \leq 0.6$ ,  $1.8 \leq k3 \leq 2.2$ ,  $1.8 \leq k4 \leq 2.2$ ,  $1.8 \leq k5 \leq 2.2$ ,  $9.5 \leq k6 \leq 10.8$ ),  $\text{Y}_{m1}\text{Ba}_{m2}\text{Cu}_{m3}\text{O}_{m4}$  ( $0.5 \leq m1 \leq 1.2$ ,  $1.8 \leq m2 \leq 2.2$ ,  $2.5 \leq m3 \leq 3.5$ ,  $6.6 \leq m4 \leq 7.0$ ), and  $\text{RE}_{p1}\text{Ba}_{p2}\text{Cu}_{p3}\text{O}_{p4}$  (RE: consisting of any of La, Nd, Sm, Eu, Gd, Dy, Ho, Er, Tm, Yb, Lu among rare-earth elements,  $0.5 \leq p1 \leq 1.2$ ,  $1.8 \leq p2 \leq 2.2$ ,  $2.5 \leq p3 \leq 3.5$ ,  $6.6 \leq p4 \leq 7.0$ ).

Claim 4 (Previously Presented): The dielectric waveguide according to claim 1, further comprising: a protective film containing silver disposed on the surface of said first copper oxide superconducting film.

Claim 5 (Currently Amended): The dielectric waveguide according to claim 1, further comprising: a bonding film provided ~~to bond on~~ on said first copper oxide superconducting film ~~to other parts that are the pedestal, the fixtures, and the other MgO blocks,~~ and consisting of one and more kinds of the bond material that is an indium or a silver paste containing an organic substance not containing a glass frit, and a silver powder.

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Claim 6 (Currently Amended): The dielectric waveguide according to claim 1, further comprising a fixture attached to fix said first single crystal magnesium oxide block on which said first copper oxide superconducting film is disposed, ~~to other parts that are the pedestal, the fixtures, and the other MgO blocks,~~ and bonded to said first copper oxide superconducting film,

wherein the portion of the fixture that directly bonds to said first copper oxide superconducting film is composed of one or more selected from the group consisting of Fe-Ni-based alloys with low thermal coefficient, sintered magnesium oxide, stabilized zirconia, partially stabilized zirconia, and polytetrafluoroethylene and ethylene tetrafluoroethylene which are deformable even at 100 K or less.

Claim 7 (Previously Presented): The dielectric waveguide according to claim 1, further comprising a pedestal to fix said first single crystal magnesium oxide block on which said first copper oxide superconducting film is disposed.

Claim 8 (Original): The dielectric waveguide according to claim 7, wherein said first single crystal magnesium oxide block is fixed mechanically on said pedestal.

Claim 9 (Previously Presented): The dielectric waveguide according to claim 1, wherein said first and second copper oxide superconducting films are oxide high-temperature superconductor composed of one or more compounds showing crystal structure anisotropy selected from the group

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consisting of  $\text{Bi}_{n1}\text{Sr}_{n2}\text{Ca}_{n3}\text{Cu}_{n4}\text{O}_{n5}$  ( $1.8 \leq n1 \leq 2.2$ ,  $1.8 \leq n2 \leq 2.2$ ,  $0.9 \leq n3 \leq 1.2$ ,  $1.8 \leq n4 \leq 2.2$ ,  $7.8 \leq n5 \leq 8.4$ ),  $\text{Pb}_{k1}\text{Bi}_{k2}\text{Sr}_{k3}\text{Ca}_{k4}\text{Cu}_{k5}\text{O}_{k6}$  ( $1.8 \leq k1+k2 \leq 2.2$ ,  $0 \leq k1 \leq 0.6$ ,  $1.8 \leq k3 \leq 2.2$ ,  $1.8 \leq k4 \leq 2.2$ ,  $1.8 \leq k5 \leq 2.2$ ,  $9.5 \leq k6 \leq 10.8$ ),  $\text{Y}_{m1}\text{Ba}_{m2}\text{Cu}_{m3}\text{O}_{m4}$  ( $0.5 \leq m1 \leq 1.2$ ,  $1.8 \leq m2 \leq 2.2$ ,  $2.5 \leq m3 \leq 3.5$ ,  $6.6 \leq m4 \leq 7.0$ ),  $\text{RE}_{p1}\text{Ba}_{p2}\text{Cu}_{p3}\text{O}_{p4}$  (RE: consisting of any of La, Nd, Sm, Eu, Gd, Dy, Ho, Er, Tm, Yb, Lu among rare-earth elements,  $0.5 \leq p1 \leq 1.2$ ,  $1.8 \leq p2 \leq 2.2$ ,  $2.5 \leq p3 \leq 3.5$ ,  $6.6 \leq p4 \leq 7.0$ ).

Claim 10 (Previously Presented): The dielectric waveguide according to claim 1, further comprising a fixture to fix said first single crystal magnesium oxide block on which said first copper oxide superconducting film is disposed, on a pedestal.

Claim 11 (Original): The dielectric waveguide according to claim 10, wherein said fixture is made of brass.

Claim 12 (Original): The dielectric waveguide according to claim 11, wherein said pedestal is made of brass.

Claim 13 (Previously Presented): The dielectric waveguide according to claim 12, wherein said fixture is bonded with indium to said first single crystal magnesium oxide block on which said first copper oxide superconducting film is disposed.

Claim 14 (Original): The dielectric waveguide according to claim 13, wherein said fixture is fixed mechanically on said pedestal.

Claim 15 (Previously Presented): The dielectric waveguide according to claim 6, further comprising a pedestal for fixing said first single crystal magnesium oxide block on which said first copper oxide superconducting film is disposed, together with said fixture.

Claim 16 (Original): The dielectric waveguide according to claim 15, wherein said fixture is fixed mechanically on said pedestal.

Claim 17 (Previously Presented): The dielectric waveguide according to claim 1, further comprising:

a pedestal to fix said first single crystal magnesium oxide block on which said first copper oxide superconducting film is disposed; and

a bonding layer to bond said first copper oxide superconducting film to said pedestal.

Claim 18 (Original): The dielectric waveguide according to claim 17, wherein said bonding layer is a silver paste containing a silver powder and an organic substance which does not contain a glass frit.

Claim 19 (Original): The dielectric waveguide according to claim 18, wherein said pedestal is a sintered magnesium oxide plate.

Claim 20 (Currently Amended): A method of production for a dielectric waveguide comprising:

a step of preparing a first single crystal magnesium oxide block having ~~a surface of an input face of orientation~~ (001), (100) or (010) and having other faces each of orientation (001), (100) or (010);

a step of forming on said surface a first copper oxide superconducting film on four or more of said other faces in a c-axis crystal orientation perpendicular to ~~four or more of the other faces the~~ face of said block on which it is disposed;

a step of preparing a second single crystal magnesium oxide block having a ~~surface face of the face~~ orientation (001), (100) or (010); and

a step of forming a second copper oxide superconducting film disposed on said ~~surface face~~ face of said second single crystal magnesium oxide block in a c-axis crystal orientation perpendicular to said ~~surface face of said second single crystal magnesium oxide block,~~

wherein said first single crystal magnesium oxide block has a face oriented at a 45 degree angle to ~~the said input face, so as to have orientation~~ (011), (101) or (110), and said second copper oxide superconducting film comes in contact with said ~~surface face oriented at a 45 degree angle of~~ said first single crystal magnesium oxide block.

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Claim 21 (Previously Presented): The method of production for the dielectric waveguide according to claim 20, wherein said step of forming a first copper oxide superconducting film comprises forming the first copper oxide superconducting film by a sputtering process or a pulse laser deposition process.